

been aptly named by Dr. Gubler), is of interest, especially in connection with Vulpian's view of the origin of the facial nerve. (See Duchenne's *De L'Électrisation localisée*, p. 653 *et seq.*) He believes that after their chiasm on the floor of the 4th ventricle, they run forward, perhaps, into the crura cerebri. Any disease low down, then, would involve the 7th pair of the same side, but the motor roots of the opposite side of the cord, producing alternate paralysis; but if the disease were *high up*, it would involve the roots of the 7th pair of the opposite side as well as the motor roots of the opposite side of the cord, producing unilateral paralysis. I find but seven cases where it is distinctly stated whether the face was affected or not, and in three of them alternate paralysis existed. In one case no *post-mortem* was obtained, in one no change in the cerebral tissue was observed, and in the third, where hemiplegia of the left side existed, with "incomplete paralysis of the right side of the face" (Ehrmann, p. 37, Case VIII.), yellow softening of the right anterior cerebral lobe was found. This latter case would certainly militate against this theory (yet the commissure of the nerves of the 7th pair is generally admitted by anatomists), but it militates equally against the view of Mr. Gubler, that alternate paralysis is intimately concerned with lesions of the tuber annulare. We must conclude with Ehrmann that our knowledge of the site of the lesions producing alternate paralysis is too scanty as yet to enable us to arrive at positive conclusions. But the subject bespeaks from medical men accuracy of observation, both of the nature of the paralysis before death, and of the site of the lesion afterwards.

ART. III.—*Successful Ligation of External Iliac Artery for Traumatic Aneurism of the Femoral; with a Statistical Table, showing the results of the operation of tying the External Iliac Artery.* By JAMES B. CUTTER, M. D., Acting Assistant-Surgeon U. S. Army.

GEORGE CLARK, private 4th New Jersey, Co. I, a large muscular man in vigorous health, whose average weight is 200 lbs.

The following is a history of the case: Eight years ago he accidentally plunged the large blade of a pocket-knife into the inner side of the left thigh, about two inches below Poupart's ligament, the blade entering the femoral artery near the origin of the profunda. The wound healed rapidly, and in one week from the time he received his injury, he resumed his usual occupation (that of a farmer). He informs me that he never experienced any pain or difficulty after his recovery, except a pricking pain at the wounded point upon unusual or excessive walking, until last August, while in the United States service.

In the latter part of August, 1863, was in the "Field General Hospital" at Warrenton, Va., his trouble, so far as I can learn, being extreme pain, located in the lower part of the abdomen; this pain was of a dull aching

character, and continued some two weeks; he recovered perfectly; was ordered to report to his regiment, which was stationed at the distance of about half a mile; he started on foot, and reached his destination at 10 o'clock A. M., Sunday; did not go on duty, but went immediately to his tent, and there remained.

About 12 o'clock M. of that day the fact that his left calf was increasing in size attracted his attention; at 12 M. on the following day, just twenty-four hours after his first perceiving the swelling, the thigh, leg, and foot had reached their greatest dimensions. Circumference of left thigh 32 inches, right 20 inches, leg in proportion. On the following day was present at "sick call," saw the regimental surgeon, and stated to him the above facts; the surgeon directed the limb to be bandaged, and the patient to enjoy *perfect rest*. Remained with his regiment five days, was then transferred back to General Hospital, at Warrenton, Va.

The patient states that, after reaching General Hospital, he suffered the most agonizing pain in the inner side of the left thigh, directly over his former wound; this pain continued three or four days without intermission. The treatment he received while in hospital was simply bandaging of the limb, and keeping it in the flexed position.

He was transferred from the above-named hospital to Washington, D. C., and from thence to the "Newark General Hospital," Oct. 13, 1863. When admitted, the whole limb was greatly enlarged, with remarkable distension of cutaneous veins. While in this hospital he has been examined by several surgeons of eminence and position, none of whom had a suspicion of aneurism of the femoral artery, some supposing there might be a tumour within the pelvis, causing pressure upon the iliac vein. He never complained of pain in the region of the aneurismal tumour, except for three or four days at General Hospital, as above mentioned, and could never recall any circumstance that would be likely to give rise to such a condition of the limb. The patient came under my observation Dec. 26, 1863, and was made the subject of *special study*.

I interrogated him repeatedly about his previous life and habits, about every accident that ever happened to him, no matter of how trivial a character it might seem to be; finally, after much labour, I had the gratification of recalling to his mind the accident that happened to him eight years ago. After ascertaining this fact, my attention was directed to aneurism, and upon placing my ear upon the small scar so distinctly marked upon the thigh I had the satisfaction of recognizing the tumour to be aneurismal, 1st, by its peculiar thrill on firm pressure with the hand, and, 2d, by the "aneurismal bruit" when the ear was applied to the tumour.

After my diagnosis was made, the patient was examined by Dr. George Taylor, surgeon in charge, and some members of the medical staff of this hospital, and my diagnosis confirmed; the patient was just previous to the operation examined by my former preceptor, Dr. J. C. Hutchison, Prof. of Surgery in the Long Island College Hospital, Brooklyn, and Dr. Abraham Coles, of this city, who also confirmed my diagnosis.

Through the kindness of my much esteemed friend, Dr. Geo. Taylor, Surgeon U. S. Army, in charge of the hospital, I was permitted to operate.

After the usual preparatory treatment, on Saturday, Feb. 6, 1864, at a quarter to 3 P. M., the patient was placed upon the operating table and anæsthesia produced by a mixture of two parts ether and one part chloroform, and the operation performed in the following manner:—

The patient being placed in the recumbent position, the abdominal muscles relaxed, an incision was made about five inches in length, commencing just outside of the external abdominal ring, and extended in a curved direction outwards and upwards, nearly parallel with Poupart's ligament, terminating about an inch above, and to the inner side of the anterior superior spinous process of the ilium; the three layers of abdominal muscles and transversalis fascia were then cautiously divided, the peritoneum separated from the iliac fossa, and carefully pushed towards the pelvis, and there retained by the hand of my careful assistant; on introducing the finger to the bottom of the wound, the external iliac artery was felt pulsating in its normal position, its sheath was then opened to a small extent, and the plain aneurismal needle passed between the vein and artery, and the latter secured by a strong ligature with three knots; the sides of the external wound were then brought into nice apposition, and secured by eight silk sutures, and dressed as is usual in wounds of this character. I should here state that upon making the incision through the integument, the venous hemorrhage was *enormous*, and it was remarked by Dr. J. M. Minor, of the Brooklyn City Hospital, whose experience and observation are extensive, that it was the most *abundant venous hemorrhage* from the *integument* that he ever saw; it was also remarked by other surgeons present. The characteristic feature of this venous hemorrhage was that it seemed to be confined almost exclusively to the integument from the entire cut surface of which it flowed as if from a sponge in a *continuous* and *copious* stream, retarded *slightly* (controlled it was not) by firm pressure. This is in a measure explained by the probable obstruction of the femoral vein by the aneurismal sac, forcing the venous circulation into the cutaneous veins.

I must here state that I was very kindly and ably aided by Dr. Minor, whose skill and good judgment were of great assistance to me. I can safely say that had not this patient been a man in *perfect* health, and with great constitutional vigour, the loss of such an amount of blood would have rendered the result of the operation more than doubtful.

What is surprising is that, notwithstanding the loss of such an amount of blood, the pulse of the patient continued good throughout the operation; all pulsation ceased in the tumour upon the application of the ligature followed by lowering of temperature, and diminution in size of the limb. Beef-tea and egg-nog were administered pretty freely; warm applications were made to the limb.

5 o'clock P. M. (one hour after the operation). Pulse of the patient much improved; is a little uneasy and restless. 6 P. M. Patient has changed his position; considerable oozing of blood from the wound; required the patient to keep *perfectly quiet*, informing him of the importance of conforming to my orders in this respect; ordered pil. opii to be repeated in the course of an hour or two if he complained of pain, or was at all restless.

Sunday.—Patient slept until 5 o'clock this morning; has been uneasy since; removed external strips of adhesive plaster and lint, wound looking well; no discharge. The temperature of the limb being perfectly restored, the warm applications were removed. This rapid restoration of temperature would seem to indicate that the collateral circulation had been established with unusual rapidity, owing probably to a certain amount of enlargement of the collateral vessels, produced by the long-continued retardation of the current of blood through the aneurismal sac.

Wednesday, 10th. Up to this date the patient has been doing remark-

ably well; corners of the wound to the extent of three inches have united by first intention. Bowels have acted once to-day; passed a great deal of flatus, which has given him much relief; pulse 100; tongue clean; appetite *good*.

11th. The bowels have acted freely, and the patient is very comfortable. The wound looks well, and continues to discharge quite freely; pus of a very healthy character.

13th. Pulse 120; tongue clean; appetite good; bowels have acted once this morning; evacuation not copious. Began the administration of the tincture of *veratrum viride* gtt. iv, increasing gtt. j, at each dose.

14th. Pulse reduced to 80. Patient doing well.

18th. Up to this date the patient is, and has been doing remarkably well. The limb is *very much* reduced in size, and the superficial veins have almost disappeared.

23d. Doing *very well*; appetite still good. Have discontinued the use of the tinct. *veratrum viride*, and have begun to give more nutritious diet, with stimulants and tonics.

Feb. 28th. Doing well, has been since last note; sleeps well at nights; no pain; appetite still good; pulse 100; wound closing kindly.

29th. Doing well.

March 2d, 25th day of the operation. Ligature separated this morning; no hemorrhage.

7th. Has been doing well; appetite good; tongue somewhat furred; pulse 110 to-day for the first time since the operation; has been allowed to sit up in bed.

14th. Has not been doing so well since last note; had had occasion to go to stool two or three times daily for the last two days; tongue thickly coated; appetite not so good. Ordered mass hyd. gr. v to be taken in the evening; cathartic to be taken on the following morning.

15th. Same to be repeated.

16th. Much improved; appetite returning.

17th. Tongue clean; bowels quite regular; appetite much improved; expresses himself as feeling much better.

April 11th. Wound has closed, leaving firm, hard cicatrix. Patient's general health *good*; sits up every day an hour or more.

18th. Patient still improves; this morning walked the length of his ward on crutches.

25th. Patient moves about every day from one ward to the other; expressed himself to me this morning as "never having felt better in his life." There is considerable œdema about the hip, which is gradually disappearing.

Résumé.—This case presents some points of interest which I will briefly allude to.

1st. A wound of the femoral artery near the profunda, followed by profuse hemorrhage, heals up so rapidly as to enable the patient to return to a laborious occupation in the space of a week.

2d. Eight years expire before he experiences any inconvenience from it, except a pricking sensation at the seat of the wound, when making any unusual exertion in walking.

3d. Without any immediate assignable cause, the calf of the leg becomes

swollen, followed by enlargement of the whole limb, in the short space of twenty-four hours.

4th. At first sight it might appear remarkable that a correct diagnosis was not sooner made. This, however, will not be wondered at, in view of the fact of the steady denial of the patient, when previously interrogated, of his ever having received any injury or wound, he always supposing the questions to have reference to wounds received in action, he never having been wounded in battle. When, however, he is very closely interrogated, reveals the fact of the wound received eight years before; attention being now drawn in the right direction, the cicatrix is discovered, and a correct diagnosis of course at once easily made out. Up to this time, the tumefaction of the limb and enlargement of cutaneous veins were attributed to obstruction of deep-seated veins, either from phlebitis, or a tumour within the pelvis, obstructing the iliac vein. Venous obstruction certainly existed, but was a *consequence*, and not a *cause*, of the trouble; a tumour (the aneurismal tumour) was indeed the cause of the disease, but was in the thigh itself, and not in the pelvis.

5th. This rapid enlargement of the limb (attaining its largest dimension in twenty-four hours from first appearance) is interesting, as seeming to indicate a proportionately rapid enlargement of the aneurismal sac, and probably that the cicatricial tissue at the seat of the original wound gave way, producing a false aneurism, for we may not suppose that a true aneurism could be formed in so short a space of time sufficient to obstruct so completely the femoral vein.

Finally, it may be asked, What was the cause of this sudden giving way in a part which had for so many years remained firm and sound? We may attribute it to two causes.

1st. To the vicissitudes and hardships of campaigning life; to irregular, unchanging and indifferent food, impairing the vigour of his nutritive function, as compared to what it had been in the quiet regularity, moral and physical, of a farmer's life, with wholesome and varied articles of diet; and, 2d, to attacks of intermittent and typhoid fever, from which he had suffered at different times, leaving the tissues doubtless in a condition more or less dyscrasic, as compared to what they had been previously.

In preparing the following table, I have carried out to a certain extent the ideas of Dr. Norris, of Philadelphia, who published in the *American Journal of the Medical Sciences* for Jan. 1847, a complete table, showing the mortality following the operation of tying the iliac artery, either for aneurism, or the arrest of hemorrhage; it includes, so far as is known, all of the recorded cases up to that year, and it is considered a valuable table and one frequently referred to.

I have but attempted to add to the statistics already collected.

Of 118 cases collected in Dr. Norris's table 85 recovered, and 33 died.

Of 113 cases in which the sex is noted, 107 were males, and 6 females.

Of 79 cases in which the site is noted, 44 were on the right, and 35 on the left.

Of the 118 cases operated upon, 2 were traumatic, 95 spontaneous, 18 in consequence of wounds or secondary hemorrhage, and 3 for varicose aneurism.

Hemorrhage is stated to have occurred in 14 cases; of these 7 died, and 7 cured.

Gangrene occurred in 16 cases out of the 118, 3 of which were cured after amputation, and 12 died.

Out of the 118 cases, 33 died: 6 from hemorrhage; 3 from sloughing of the sac; 13 from mortification of the limb; 1 from bursting of the aorta ten weeks and six days after the operation; 2 from prostration; 2 of peritonitis; 2 of tetanus; 1 from disease of the heart; 1 from delirium tremens; 1 of diffuse inflammation; 1 not noted.

Mortality.—Of 35 cases included in the following table 20 recovered, and 13 died. In two instances, Nos. 3 and 9, the result is not stated.

Sex.—In 34 cases in which the sex is noted, 31 were males, and 3 females.

Age.—Age is noted in 29 instances, in which there were above 80 years, 1; between 60 and 70, 1; 50 and 60, 2; 40 and 50, 2; 30 and 40, 11; 20 and 30, 11; below 20, 1.

Right or Left Side.—This is noted in 30 cases, of which there were 19 on the right side, and 11 on the left side.

Disease or Injury.—In 33 cases in which the disease or injury is stated, 22 were spontaneous aneurisms; 7 traumatic aneurisms; 1 wound of external iliac; 1 pulsating tumour of thigh (recurrent).

Period the Ligature Separated.—This is noted in 22 instances. In 8 cases the ligature separated before the 20th day; 6 between the 20th and 30th; 2 between the 30th and 40th; 5 beyond the 40th. The 13th was the earliest day at which the ligature separated, and 50th was the longest period at which it remained.

Hemorrhage after the Operation.—This occurred in 5 cases, all of which proved fatal, with the single exception of Wood's case, which was cured by pressure continued 47 days.

Gangrene of the Limb.—This occurred in 3 cases, all of which died, one undergoing amputation of the thigh.

Out of 33 cases, of which the result is known, 13 died: of these, 3 died of hemorrhage; 1 from pleurisy; 3 from gangrene; 3 from peritonitis; 1 from pelvic abscess; 1 from air in the veins; 1 from exhaustion.

Statistical Table showing the Results of Operations

No.	Surgeon.	Sex.	Age.	Right or left side.	Disease.	Duration of disease.	Ligature separated.	Date of Operation.	Result.
1	Cocks	M.	46	Right side	Spon. aneurism	2 months	60th day	Nov. 1, 1847	Cured
2	Fergusson	"	36	Left side	" "	12 months		Nov. 17, 1855	Died
3	Solly	"	30	Right side	" "	4 years	26th day	Feb'y, 1854	
4	Cocks	"	26	"	" "	1 month	15th day	Nov. 23, 1858	Died
5	Brooks	"	57	"	" "	2 years	46th day	Feb. 13, 1856	Cured
6	Fletcher	"	50	"	" "	6 months		Sept. 12, 1862	Died
7	Furner	"	30	"	" "	3 months	16th day	Sept. 11, 1858	Cured
8	Lidell	F.	33	"	" "	1 month	40th day	Oct. 4, 1856	Cured
9	Skey						16th day	Feb'y, 1854	
10	Erichsen	M.	64	"	" "			Aug. 3, 1861	Died
11	Hamilton, F. H.	"	14	Left side	Trau. aneurism	6 weeks	27th day	Sept. 19, 1856	Died
12	Wood, J. R.	"	22	"	" "	33 days	13th day	Dec. 8, 1855	Cured
13	Castro	"	29	"	Spon. aneurism	1 year	35th day	April 10, 1849	Cured
14	Fox	"	24	Right side	" "	4 months	17th day	Oct. 11, 1849	Cured
15	Smith	"	37	Left side	" "		20th day	Aug. 7, 1855	Cured
16	Halpin	"	21	Right side	" "			Sept. 12, 1851	Died
17	Ogden	"	26	"	Wound of external iliac			Nov. 14, 1825	Died
18	Denne	"	30	Left side	Spon. aneurism	1 month	29th day	May 9, 1847	Cured
19	McNeill	"	27	"	Trau. aneurism	23 days	40th day	Dec. 30, 1854	Cured
20	Miller	"			Spon. aneurism	3 months	21st day	Jan. 14, 1854	Cured
21	Van Buren	"	25	Right side	" "	5 months	17th day	Aug. 17, 1848	Cured
22	Mott	"	21	"	Arterio venous	2 years		Dec. 16, 1848	Died
23	Cooper, E. S.	"			Trau. aneurism				Cured
24	Wood, J. R.	F.	26	Left side	Spon. aneurism	1 month		Dec. 17, 1859	Died
25	Daret	M.	56	"	" "		45th day	June 19, 1842	Cured
26	Wood, J. R.	"	31	Right side	" "	3 months	13th day	Feb. 25, 1860	Cured
27	Wood, J. R.	"	30	"	" "	18 months	13th day	Sept. 9, 1856	Cured
28	Mercier	"			" "				Died
29	Wedderburn	"							
30	Cutter, J. B.	"	23	Left side	Trau. aneurism	8 years	25th day	Feb. 6, 1864	Cured
31	Gibson	"	45	"	Spon. aneurism		21st day	July 2, 1848	Died
32		"		Right side	Tran. aneurism			1845	Died
33	Buck	"	38	Left side	Hemorrhage after ligature of femoral			Feb. 23, 1848	Died
34	Buck	"	37	Right side	Spon. aneurism	6 weeks	32d day	Aug. 7, 1858	Cured
35	Halsted	F.	37	"	Pulsating fibro-recurrent tum.	14 months		April 23, 1864	Died

for Tying External Iliac Artery performed since 1846.

Period of death	Cause of death.	Work.	Remarks.
		Edinburgh Med. and Sur. Jour., Vol. 1, 1848	On the 50th day an attempt was made to bring away the ligature by force, it broke leaving the knot in the wound.
6th day	Pleuritis	Med. Times & Gaz., Vol. 2, 1858	
31st day	Hemorrhage	Med. Times & Gaz., Vol. 1, 1854 Med. Times & Gaz., Vol. 1, 1858 Lancet, 1856	
30th day	Air in veins	Brit. Med. Jour., Vol. 2, 1862 Med. Times & Gaz., Vol. 1, 1858 Med. Times & Gaz., Vol. 1, 1858	There were doubts as to the cause of death.
36th day	Pelvic abscess	Med. Times & Gaz., Vol. 1, 1854	Dr. Stephen Smith tied the primitive iliac on the same patient in 1858 for a return of the disease. Died of hemorrhage.
32d day	Gangrene	Lancet, Vol. 2, 1861 Buffalo Med. Jour., Vol. 12, 1857	When reported was under treatment.
		Am. Jour. Med. Sci., 1849 Am. Jour. Med. Sci., 1849 Am. Jour. Med. Sci., 1851	Oct. 16th the thigh was amputated just above its middle; died fifth day after. Five days after the ligature separated hemorrhage supervened, pressure by the hand was kept up 12 days, and by shot weights 35 days.
9th day	Hemorrhage	Am. Jour. Med. Sci., 1851	Two years after the femoral of the opposite limb was successfully tied for popliteal aneurism.
8th day	Hemorrhage	Am. Jour. Med. Sci., 1853	Hemorrhage caused by sloughing bubo opening the aneurismal sac.
		Association Med. Jour., 1853 Am. Jour. Med. Sci., 1856 Association Med. Jour., 1854	Six days after the ligature was applied the limb mortified.
6th day	Gangrene	N. Y. Jour. Med., Vol. 2, 1849 N. Y. Jour. Med., Vol. 2, 1849 N. Y. Jour. Med., Vol. 3, 1857	The ligature was placed very near the bifurcation of the external and internal iliac arteries. Ascertained after death. The patient died of phthisis 2 or 3 years after.
4th day	Peritonitis	N. Y. Jour. Med., Vol. 3, 1860 N. O. Med. & Surg. Jour. Vol. 3 N. Y. Jour. Med., Vol. 2, 1849 Not reported	
11th day	Gangrene	N. A. Med. Chir. Rev. Vol. 2, 1858 N. O. Med. & Surg. Jour. Sept. '46	The aneurism burst the evening before the operation, the patient "lost half a gallon of blood." Case went on favourably until the sixth day, when profuse hemorrhage occurred from the aneurismal sac. Two days afterwards hemorrhage again took place.
		Monthly Retrospect, 1848	Gangrene occurred on the following day, and the patient gradually declined, and died on the 11th day after the operation.
	Peritonitis	Guthrie's Commentary on the Surgery of the War	
2d day	Exhaustion	Not published	Patient was admitted into U. S. Hospital with compound fracture of thigh just above the knee-joint. Thigh amputated; secondary hemorrhage occurred four days afterwards; on the same day a ligature was applied to the femoral just above the profunda; fourth day after hemorrhage from wound in groin; iliac tied.
	Peritonitis	Not published Not published	